CLAIMS

1. A polypeptide which:

   (i) comprises the amino acid sequence as recited in SEQ ID NO:68;

   (ii) is a fragment thereof which functions as an alpha-2-macroglobulin-like proteinase inhibitor, or has an antigenic determinant in common with a polypeptide according to (i); or

   (iii) is a functional equivalent of (i) or (ii).

2. A polypeptide according to claim 1 which:

   (i) consists of the amino acid sequence as recited in SEQ ID NO:68;

   (ii) is a fragment thereof which functions as an alpha-2-macroglobulin-like proteinase inhibitor, or has an antigenic determinant in common with a polypeptide according to (i); or

   (iii) is a functional equivalent of (i) or (ii).

3. A polypeptide which is a fragment as recited in claim 1 or claim 2, wherein said fragment comprises or consists of the amino acid sequence recited in SEQ ID NO:113 or SEQ ID NO:115 or is a functional equivalent thereof.

4. A polypeptide which:

   (i) comprises the amino acid sequence as recited in SEQ ID NO:112;

   (ii) is a fragment thereof which functions as an alpha-2-macroglobulin-like proteinase inhibitor, or has an antigenic determinant in common with a polypeptide according to (i); or

   (iii) is a functional equivalent of (i) or (ii).

5. A polypeptide according to claim 4 which:

   (i) consists of the amino acid sequence as recited in SEQ ID NO:112;

   (ii) is a fragment thereof which functions as an alpha-2-macroglobulin-like proteinase inhibitor, or has an antigenic determinant in common with a polypeptide according to (i); or

   (iii) is a functional equivalent of (i) or (ii).

6. A polypeptide which is a fragment as recited in claim 4 or claim 5, wherein said fragment comprises or consists of the amino acid sequence recited in SEQ ID NO:117, SEQ ID NO:119 or SEQ ID NO:121, or is a functional equivalent thereof.

7. A polypeptide which is a functional equivalent according to part (iii) of any of the above claims, characterised in that it is homologous to the amino acid sequence as recited in SEQ ID NO:68 or SEQ ID NO:112 and is an alpha-2-macroglobulin-like proteinase inhibitor.

8. A polypeptide which is a fragment or a functional equivalent as recited in any one of claims 1 to 7, which has greater than 80% sequence identity with the amino acid sequence recited in SEQ ID NO:68 or SEQ ID NO:112, or with an active fragment thereof, preferably greater than 85%, 90%, 95%, 98% or 99% sequence identity.

9. A polypeptide which is a functional equivalent as recited in any one of claims 1 to 8, which exhibits significant structural homology with a polypeptide having the amino acid sequence recited in SEQ ID NO:68 or SEQ ID NO:112.

10. A polypeptide which is a fragment as recited in claims 1-6 and claim 8 having an antigenic determinant in common with the polypeptide of part (i) of any one of claim 1 to claim 4 which consists of 7 or more amino acid residues from the amino acid sequence recited in SEQ ID NO:68 or SEQ ID NO:112.

11. A purified nucleic acid molecule which encodes a polypeptide according to any one of the preceding claims.

12. A purified nucleic acid molecule according to claim 11, which comprises the nucleic acid sequence as recited SEQ ID NO:67 or SEQ ID NO:111, or is a redundant equivalent or fragment thereof.

13. A purified nucleic acid molecule according to claim 11 which consists of the nucleic acid sequence as recited in SEQ ID NO:67 or SEQ ID NO:111, or is a redundant equivalent or fragment thereof.

14. A purified nucleic acid molecule according to claim 11 which comprises or consists of the nucleic acid sequence as recited in SEQ ID NO:114, SEQ ID NO:116, SEQ ID NO:118, SEQ ID NO:120 or SEQ ID NO:122, or is a redundant equivalent thereof.

15. A purified nucleic acid molecule which hybridizes under high stringency conditions with a nucleic acid molecule according to any one of claims 11 to 14.

16. A vector comprising a nucleic acid molecule as recited in any one of claims 11 to 15.

17. A host cell transformed with a vector according to claim 16.

18. A ligand which binds specifically to the alpha-2-macroglobulin-like proteinase inhibitor polypeptide according to any one of claims 1 to 10.

19. A ligand according to claim 18, which is an antibody.

20. A compound that either increases or decreases the level of expression or activity of a polypeptide according to any one of claims 1 to 10.

21. A compound according to claim 20 that binds to a polypeptide according to any one of claims 1 to 10 without inducing any of the biological effects of the polypeptide.

22. A compound according to claim 22, which is a natural or modified substrate, ligand, enzyme, receptor or structural or functional mimetic.

23. A polypeptide according to any one of claims 1 to 10, a nucleic acid molecule according to any one of claims 11 to 15, a vector according to claim 16, a host cell according to claim 17, a ligand according to claim 18 or claim 19, or a compound according to any one of claims 20 to 22, for use in therapy or diagnosis of disease.

24. A method of diagnosing a disease in a patient, comprising assessing the level of expression of a natural gene encoding a polypeptide according to any one of claims 1 to 10, or assessing the activity of a polypeptide according to any one of claims 1 to 10, in tissue from said patient and comparing said level of expression or activity to a control level, wherein a level that is different to said control level is indicative of disease.

25. A method according to claim 24 that is carried out *in vitro*.

26. A method according to claim 24 or claim 25, which comprises the steps of:

a) contacting a ligand according to claim 18 or claim 19 with a biological sample under conditions suitable for the formation of a ligand-polypeptide complex; and

b) detecting said complex.

27. A method according to claim 24 or claim 25, comprising the steps of:

a) contacting a sample of tissue from the patient with a nucleic acid probe under stringent conditions that allow the formation of a hybrid complex between a nucleic

acid molecule according to any one of claims 11 to 15 and the probe;

b) contacting a control sample with said probe under the same conditions used in step a); and

c) detecting the presence of hybrid complexes in said samples; wherein detection of levels of the hybrid complex in the patient sample that differ from levels of the hybrid complex in the control sample is indicative of disease.

28. A method according to claim 24 or claim 25, comprising:

a)contacting a sample of nucleic acid from tissue of the patient with a nucleic acid primer under stringent conditions that allow the formation of a hybrid complex between a nucleic acid molecule according to any one of claims 11 to 15 and the primer;

b)contacting a control sample with said primer under the same conditions used in step a); and

c)amplifying the sampled nucleic acid; and

d)detecting the level of amplified nucleic acid from both patient and control samples; wherein detection of levels of the amplified nucleic acid in the patient sample that differ significantly from levels of the amplified nucleic acid in the control sample is indicative of disease.

29. A method according to claim 24 or claim 25 comprising:

a)obtaining a tissue sample from a patient being tested for disease;

b)isolating a nucleic acid molecule according to any one of claims 11 to 15 from said tissue sample; and

c)diagnosing the patient for disease by detecting the presence of a mutation which is associated with disease in the nucleic acid molecule as an indication of the disease.

30. The method of claim 29, further comprising amplifying the nucleic acid molecule to form an amplified product and detecting the presence or absence of a mutation in the amplified product.

31. The method of claim 29 or claim 30, wherein the presence or absence of the mutation in the patient is detected by contacting said nucleic acid molecule with a nucleic acid

probe that hybridises to said nucleic acid molecule under stringent conditions to form a hybrid double-stranded molecule, the hybrid double-stranded molecule having an unhybridised portion of the nucleic acid probe strand at any portion corresponding to a mutation associated with disease; and detecting the presence or absence of an unhybridised portion of the probe strand as an indication of the presence or absence of a disease-associated mutation.

32. A method according to any one of claims 24 to 31, wherein said disease includes, but is not limited to reproductive disorders, cell proliferative disorders, including neoplasm, melanoma, lung, colorectal, breast, pancreas, head and neck and other solid tumours; myeloproliferative disorders, such as leukemia, non-Hodgkin lymphoma, leukopenia, thrombocytopenia, angiogenesis disorder, Kaposis' sarcoma; autoimmune/inflammatory disorders, including allergy, inflammatory bowel disease, pancreatitis, arthritis, psoriasis, psoriasis vulgaris, respiratory tract inflammation, asthma, and organ transplant rejection; cardiovascular disorders, including hypertension, oedema, angina, atherosclerosis, thrombosis, sepsis, shock, reperfusion injury, and ischemia, particularly ischemic heart disease; neurological disorders including central nervous system disease, Alzheimer's disease, brain injury, Parkinson's disease, amyotrophic lateral sclerosis, and pain; developmental disorders; metabolic disorders including diabetes mellitus, osteoporosis, and obesity, AIDS, renal disease, particularly idiopathic nephrotic syndrome; lung injury; infections including viral infection, bacterial infection, fungal infection and parasitic infection, particularly *Trypanosoma cruzi* infection and other pathological conditions.

33. A method according to any one of claims 24 to 31, wherein said disease is a disease in which alpha-2-macroglobulin-like proteinase inhibitors are implicated.

34. Use of a polypeptide according to any one of claims 1 to 10 as an alpha-2-macroglobulin-like proteinase inhibitor.

35. A pharmaceutical composition comprising a polypeptide according to any one of claims 1 to 10, a nucleic acid molecule according to any one of claims 11 to 15, a vector according to claim 16, a host cell according to claim 17, a ligand according to claim 18 or claim 19, or a compound according to any one of claims 20 to 22.

36. A vaccine composition comprising a polypeptide according to any one of claims 1 to 10 or a nucleic acid molecule according to any one of claims 11 to 15.

37. A polypeptide according to any one of claims 1 to 10, a nucleic acid molecule according to any one of claims 11 to 15, a vector according to claim 16, a host cell according to claim 17, a ligand according to claim 18 or claim 19, a compound according to any one of claims 20 to 22, or a pharmaceutical composition according to claim 35, for use in the manufacture of a medicament for the treatment of reproductive disorders, cell proliferative disorders, including neoplasm, melanoma, lung, colorectal, breast, pancreas, head and neck and other solid tumours; myeloproliferative disorders, such as leukemia, non-Hodgkin lymphoma, leukopenia, thrombocytopenia, angiogenesis disorder, Kaposis' sarcoma; autoimmune/inflammatory disorders, including allergy, inflammatory bowel disease, pancreatitis, arthritis, psoriasis, psoriasis vulgaris, respiratory tract inflammation, asthma, and organ transplant rejection; cardiovascular disorders, including hypertension, oedema, angina, atherosclerosis, thrombosis, sepsis, shock, reperfusion injury, and ischemia, particularly ischemic heart disease; neurological disorders including central nervous system disease, Alzheimer's disease, brain injury, Parkinson's disease, amyotrophic lateral sclerosis, and pain; developmental disorders; metabolic disorders including diabetes mellitus, osteoporosis, and obesity, AIDS, renal disease, particularly idiopathic nephrotic syndrome; lung injury; infections including viral infection, bacterial infection, fungal infection and parasitic infection, particularly *Trypanosoma cruzi* infection and other pathological conditions.

38. A polypeptide according to any one of claims 1 to 10, a nucleic acid molecule according to any one of claims 11 to 15, a vector according to claim 16, a host cell according to claim 17, a ligand according to claim 18 or claim 19, a compound according to any one of claims 20 to 22, or a pharmaceutical composition according to claim 35, for use in the manufacture of a medicament for the treatment of a disease in which alpha-2-macroglobulin-like proteinase inhibitors are implicated.

39. A method of treating a disease in a patient, comprising administering to the patient a polypeptide according to any one of claims 1 to 10, a nucleic acid molecule according to any one of claims 11 to 15, a vector according to claim 16, a host cell according to claim 17, a ligand according to claim 18 or claim 19, a compound according to any one of claims 20 to 22, or a pharmaceutical composition according to claim 35.

40. A method according to claim 39, wherein, for diseases in which the expression of the

natural gene or the activity of the polypeptide is lower in a diseased patient when compared to the level of expression or activity in a healthy patient, the polypeptide, nucleic acid molecule, vector, ligand, compound or composition administered to the patient is an agonist.

41. A method according to claim 39, wherein, for diseases in which the expression of the natural gene or activity of the polypeptide is higher in a diseased patient when compared to the level of expression or activity in a healthy patient, the polypeptide, nucleic acid molecule, vector, ligand, compound or composition administered to the patient is an antagonist.

42. A method of monitoring the therapeutic treatment of disease in a patient, comprising monitoring over a period of time the level of expression or activity of a polypeptide according to any one of claims 1 to 10, or the level of expression of a nucleic acid molecule according to any one of claims 11 to 15 in tissue from said patient, wherein altering said level of expression or activity over the period of time towards a control level is indicative of regression of said disease.

43. A method for the identification of a compound that is effective in the treatment and/or diagnosis of disease, comprising contacting a polypeptide according to any one of claims 1 to 10 or a nucleic acid molecule according to any one of claims 11 to 15 with one or more compounds suspected of possessing binding affinity for said polypeptide or nucleic acid molecule, and selecting a compound that binds specifically to said nucleic acid molecule or polypeptide.

44. A kit useful for diagnosing disease comprising a first container containing a nucleic acid probe that hybridises under stringent conditions with a nucleic acid molecule according to any one of claims 11 to 15; a second container containing primers useful for amplifying said nucleic acid molecule; and instructions for using the probe and primers for facilitating the diagnosis of disease.

45. The kit of claim 44, further comprising a third container holding an agent for digesting unhybridised RNA.

46. A kit comprising an array of nucleic acid molecules, at least one of which is a nucleic acid molecule according to any one of claims 11 to 15.

47. A kit comprising one or more antibodies that bind to a polypeptide as recited in any

one of claims 1 to 10; and a reagent useful for the detection of a binding reaction between said antibody and said polypeptide.

48. A transgenic or knockout non-human animal that has been transformed to express higher, lower or absent levels of a polypeptide according to any one of claims 1 to 10.

49. A method for screening for a compound effective to treat disease, by contacting a non-human transgenic animal according to claim 48 with a candidate compound and determining the effect of the compound on the disease of the animal.